Section 4.20

Construction Impacts

4.20.1 Approach and Methodology

4.20.1.1 Changes since June 2000 Final EIS

This section supplements the construction impacts analysis presented in the Final EIS. This analysis of construction impacts was based on the following review and consultation.

- Review of Section 4.20 of the previous Final EIS.
- Review of the resource-specific technical analyses developed for this Supplemental EIS.
- Consultation with UDOT regarding construction activities that have taken place to date and project design changes.
- Review of actual impacts that occurred during the initial construction activities.

UDOT began construction on Legacy Parkway in summer 2001. The project under construction was the Preferred Alternative from the Final EIS (Alternative D). UDOT implemented a design-build delivery system to construct the project until construction was halted in November 2001 because of an injunction from the U.S. Court of Appeals for the Tenth Circuit. The design-build contract has since been terminated. A new design-bid-build contract would be initiated if the lead agencies approve any of the build alternatives.

Detailed analysis of highway construction impacts is sometimes difficult to provide under the design-build delivery system because the exact locations of material borrow and disposal sites, haul roads, detour routes, and other details of the construction process are often not known when the EIS is prepared. That was the case when the previous Final EIS was prepared. However, because construction was started on a portion of the Legacy Parkway project (before being halted by the court), the details of some of these impacts can be estimated by drawing from the actual experiences of project construction.

The existing conditions, including construction activities to date and changes that have been made to the design of the project as well as impacts of previous construction and reasonably foreseeable future construction impacts, are discussed below.

4.20.1.2 Changes since Draft Supplemental EIS

As stated in Section 4.0, *Introduction*, and as described in Section 3.4.2, *Modified Build Alternatives A, B, C, and D/E*, additional minor modifications have been made to the alignments of Alternatives A and E (Final EIS Preferred Alternative) since preparation of the Draft Supplemental EIS. These changes would result in a further slight reduction in many of the construction-related impacts. Additionally, construction best management practices (BMPs) have been added to the construction mitigation to ensure that no runoff leaves the right-of-way.

4.20.2 Affected Environment

This section presents a summary of the construction activities to date and changes made to the design of the project.

4.20.2.1 Construction Activities to Date

The following construction activities have been completed to date.

- **Southern Interchange**. The contractor cleared and grubbed (removed vegetation from) about 4.9 ha (12 ac) at the I-215 interchange location at the southern terminus of the proposed action. The contractor also placed fill at varying heights (up to 6 m [20 ft]) in this area (Campagna pers. comm.).

- **Mainline**. The contractor cleared, grubbed, and performed grading and filling (about 0.6 m to 0.9 m [2 ft to 3 ft] in height) on a segment about 6 km (3.7 mi) long at the southern terminus of the project near I-215 (Campagna pers. comm.). The contractor also cleared and grubbed a segment about 1 km (0.7 mi) long just north of 500 South.

- **Northern Interchange**. The entire interchange at I-15 at the northern terminus of the project has been cleared and grubbed. Construction continues on the extension of Park Lane (formerly Burke Lane) and all ramps from Park Lane to I-15 and US-89 as part of the *Farmington City Master Transportation Plan* (City of Farmington 1998) and the Sheppard Lane project. Construction of drainage facilities in this area also continues as part of implementing the master plan and the Sheppard Lane project. The Park Lane (formerly Burke Lane) and drainage facility construction is planned for completion in the spring of 2005. Some bridge construction (piers and abutments) was initiated for the Legacy Parkway mainline over I-15, but it was not completed.

4.20.2.2 Design Changes

The type of construction impacts described in Section 4.20 of the previous Final EIS have not changed since publication of the Final EIS. However, the construction delivery system has changed slightly from design-build to design-bid-build. *Design-bid-build* is the traditional project delivery approach that segregates design and construction responsibilities by awarding them to an independent private engineer and a separate private contractor. By doing so, design-bid-build separates the delivery process into three linear phases: 1) design; 2) bid; and 3) build, or construction. The *design-build* project delivery method combines these services into a single contract. Under the design-build process, a single, fixed-fee contract

is executed for both architectural/engineering and construction services. This change is not likely to affect construction-related impacts.

In addition, three design changes have been made since publication of the June 2000 Final EIS that would slightly reduce the magnitude of construction impacts.

- **Narrower Right-of-Way**. Since publication of the Final EIS, UDOT revised its minimum design standard for median width from 20 m (66 ft) to 15 m (50 ft). As discussed in Section 2.1, *Narrower Right-of-Way*, the width of the Legacy Parkway right-of-way has been reduced from 100 m (328 ft) to 95 m (312 ft). This will reduce the footprint of the construction area and the area of disturbed earth.

- **Reduced Embankment Height**. During the design-build process, UDOT and the contractor reduced the embankment height for the mainline in all areas except floodplain areas from 3 m (9 ft), as presented in the Final EIS, to 2 m (6 ft). This is a reduction in fill height of about 1 m (3 ft) over a large portion of the highway (only between 5 and 11 percent of the overall alignment lies with the Corps floodplain for any build alternative [see Section 4.14, *Floodplains*]). The reduced embankment height will reduce the amount of earthwork and fill required for construction.

- **Lengthened Bridges**. To provide support towards the goal of integration of mass transit with the design and construction of Legacy Parkway, the bridge structures were lengthened to accommodate the physical integration of the commuter rail project at Park Lane (formerly Burke Lane), State Street, Glovers Lane, I-15 southbound to Legacy Parkway southbound ramp, Legacy Parkway northbound to I-15 northbound ramp, US-89 southbound to Legacy Parkway southbound ramp, and Legacy Parkway northbound to US-89 northbound ramp.

In addition and as described in Section 3.4, the alignments of Alternatives A and E have been modified slightly since publication of the Draft Supplemental EIS to further avoid impacts. These modifications would result in a further slight reduction in many of the construction-related impacts.

4.20.3 Environmental Consequences and Mitigation Measures

Section 4.20.1 of the June 2000 Final EIS described construction-related impacts under the No-Build and build alternatives. This section provides updated and/or new construction-related impacts relative to implementation of the build alternatives. Construction-related impacts and their associated mitigation measures that were disclosed in the Final EIS but have not changed since publication of that document are not described herein.

4.20.3.1 No-Build Alternative

Existing Conditions (2004) and Future Conditions (2020)

No changes have taken place since publication of the Final EIS that warrant updating this section. The information regarding the No-Build Alternative in the Final EIS is still accurate.

4.20.3.2 Build Alternatives

As described in Section 4.20 of the Final EIS, construction of any proposed build alternative would result in temporary construction-related impacts from ground disturbance and operation of equipment. Possible impacts would include air quality, noise, water quality, wetlands, wildlife, cultural resources, visual resources, business operations, utility service, railroad operations, and traffic flow. These impacts, as disclosed in Section 4.20 and the resource-specific sections of the previous Final EIS, would still occur. However, as noted above, they would be reduced by the reduced right-of-way width, reduced embankment height, and reduced amount of earthwork needed to construct the project. The narrower right-of-way would slightly decrease predicted impacts on air quality from fugitive dust; on water quality from erosion and suspended sediments; on wetlands from construction activities; and on archaeological, paleontological, and historical resources that might be present underground. The reduced embankment height would decrease the amount of earthwork and fill required for the project, thus reducing the amount of sand and gravel that would be hauled from sand and gravel pits to the project.

Because the impacts identified in the Final EIS would still occur but to a lesser degree, they are not detailed here. However, because previous construction activities provided information on sand- and gravel-related impacts that was not available at the time the Final EIS was prepared, those impacts are disclosed below.

Impacts from Sand and Gravel Sources and Truck Hauling

Sand and gravel sources for highway construction projects can include existing commercial sand and gravel pits (also referred to as material borrow sources) or new sources developed for a specific project. It is unlikely that a new sand and gravel pit would be developed for constructing Legacy Parkway because commercial pits already exist near the project alignment. The design-builder that was under contract for the initial construction of the project in 2001 used material from two nearby pits; eight sand and gravel pits near the study area could potentially provide the fill material necessary to construct any proposed build alternative.

The Final EIS did not include a discussion of impacts related to the procurement of sand and gravel for the proposed action because UDOT does not specify materials sources for private construction contractors bidding on UDOT projects, and as a result, the location of the source(s) was not known at that time. A discussion of typical impacts to be expected from the procurement of sand and gravel and information gained from actual construction activities to date is presented below.

UDOT does not specify particular sand and gravel sources for its contractors because that would eliminate competition from non-specified sources and would be inconsistent with the State of Utah's procurement guidelines designed to control costs of publicly funded projects. Therefore, private contractors bidding on UDOT projects determine the source of the sand and gravel and how the material will be transported. Typically contractors use dump trucks to haul the material from a commercial sand and gravel pit to various staging areas along the project route.

The environmental effects produced by the sand and gravel sources are addressed during the permitting process for a particular site. Local governments regulate localized impacts from operation of a mine, such as noise, dust, congestion, traffic, zoning, and erosion runoff. The Utah Department of Environmental Quality also regulates dust and water quality impacts from mines.

Typical impacts from sand and gravel pit operations include air quality and water quality impacts caused by fugitive dust, erosion, and suspended sediments; noise; and increased truck traffic on local routes. For existing active commercial sand and gravel pits, these impacts are already present and mitigation measures are in place. Providing material for construction of the Legacy Parkway project could increase the quantity of material mined at a particular sand and gravel pit for a limited period. Increasing the quantity of material mined at a particular pit would not necessarily magnify impacts on air quality or water quality because air and water quality impacts depend on the surface area of earth that is disturbed, and mining activities would most likely extend vertically instead of laterally. Noise and truck traffic associated with the sand and gravel pit could increase temporarily.

The design-builder that was under contract for the initial construction of the project in 2001 used material from the Staker Parson pit on Beck Street in North Salt Lake and the Craythorne pit near Hill Air Force Base in Syracuse. Table 4.20-1 shows existing commercial sand and gravel pits near the project area.

Table 4.20-1 Commercial Sand and Gravel Pits near Proposed Legacy Parkway Alignments

Sand and Gravel Pit	Location
Allroc	2500 N. Beck Street, North Salt Lake
Construction Products Company	1075 N. Warm Springs Road, North Salt Lake
Craythorne	601 West 1700 South, Syracuse
Geneva Rock	5400 South 6000 West, West Valley City
Geneva Rock	2635 E. South Weber Drive, South Weber
Lakeview Rock Products	2300 N. Beck Street, North Salt Lake
Staker Parson	1810 N. Beck Street, North Salt Lake
Staker Parson	7425 South 2700 East, South Weber

Most of the earthwork required for Legacy Parkway would be for fill. Table 4.20-2 shows earthwork quantities estimated in the Final EIS and in the Supplemental EIS. The earthwork quantities in the Supplemental EIS are lower than those in the Final EIS because the right-of-way and embankments of the modified project have been reduced. The cost estimates and earthwork quantities that were provided in Appendix N of the Final EIS have been updated in Appendix G, *Updated Cost Estimates*, of the Supplemental EIS.

Some fill has already been placed on the Alternative D (Final EIS Preferred Alternative) alignment, which overlaps in part with the alignments of Alternatives A, B, and C in the area where the fill was placed. The quantities shown in Table 4.20-2 have not been reduced to account for the fill that has already been placed.

Truck trips were calculated from the total earthwork amount (rounded to the nearest 1,000 cubic meters), including cut and fill.

The contractor hired for the design-build work conducted in 2001 estimated that about 8 million cubic meters (10.5 million cubic yards) of fill would be required for construction of Alternative D (Final EIS Preferred Alternative), which is less than the 10 million cubic meters (13 million cubic yards) estimated in the Final EIS. The earthwork estimates from the Supplemental EIS and Final EIS are shown in Table 4.20-2 for comparison purposes.

Table 4.20-2 Required Earthwork and Construction-Related Energy Consumption by Alternative

Alternative	Estimated Amount of Earthwork, cubic m (cubic yd) [1]	Approximate Number of Truck Trips [2]	Vehicles Miles Traveled	Fuel Consumption (Gallons)	Energy Consumption (million Btu)
No-Build Alternative	None	0	0.0	0.0	0.0
Alternative A	10,000,000 (13,000,000)	720,000	10,080,000	1,344,000	168,000
Alternative B	13,000,000 (17,000,000)	940,000	13,160,000	1,754,667	219,333
Alternative C	10,000,000 (13,000,000)	720,000	10,080,000	1,344,000	168,000
Alternative D (Final EIS Preferred Alternative)	8,000,000 (10,500,000)	580,000	8,120,000	1,082,667	135,333
Alternative E	8,000,000 (10,500,000)	580,000	8,120,000	1,082,667	135,333

Notes:

Btu = British thermal unit

One gallon gasoline = 125,000 Btu (Oregon State Department of Energy 2003).

[1] The estimated amount of earthwork necessary for constructing Alternatives A, B, and C was derived from Appendix N of the Final EIS. These figures are overstated because they do not account for a reduction in the proposed embankment height (see 4.20.2.2, *Design Changes*). The amount of earthwork necessary for constructing Alternatives D and E was derived from final design calculation and the Legacy Parkway partial termination contract.

[2] The approximate number of truck trips is based on a truck capacity of 13.7 cubic meters (18 cubic yards).

Source: U.S. Energy Information Administration 2004.

Constructing the Legacy Parkway project would temporarily increase construction truck traffic on haul routes. Trucks would travel from sand and gravel pits to the project site and from cut areas on the project site to other fill or disposal locations. To reduce the impact on local roads, after the previous Final EIS was published UDOT specified that the contractor only use state roads as haul routes. UDOT is still committed to this mitigation measure. Haul routes would vary depending on where construction were occurring along the project alignment.

Energy Impacts

Constructing any build alternative would involve operating heavy machinery with a resulting impact on energy usage. To evaluate construction-related energy impacts, the approximate number of truck trips associated with each build alternative was estimated and is illustrated in Table 4.20-2. The figures associated with vehicle-miles traveled in Table 4.20-2 were based on an average truck trip length of 22.5 km (14 mi) which, in turn, was based on assumptions regarding which sand and gravel pit(s) in the study area would be used and the location along the alignment to and from which the trucks travel. The average fuel efficiency of the type of trucks typically used for earthwork was estimated at 7.5 mpg.

Impacts on Clark Lane Historic District

As described in Section 4.16, *Historic and Archaeological Resources*, the Clark Lane Historic District (CLHD) is located on State Street between 200 West and 400 West in Farmington.[1] Residents of the CLHD raised concerns about construction impacts after a public notification (July 2001) identified a construction haul route along State Street through the CLHD. Representatives from the CLHD summarized their concerns to UDOT in a letter dated April 17, 2003 (Appendix A). The letter conveyed concerns about impacts from vibrations from pile driving, impacts on the historic streetscape, and impacts from truck vibrations. Below is a discussion of how each concern was addressed.

Vibrations from Pile Driving

The letter from the CLHD residents stated that groundborne vibrations from pile driving during the reconstruction of the State Street overpass could damage historic structures. In 2001, UDOT conducted vibration monitoring and determined that vibration levels associated with reconstruction of the overpass would not be high enough to affect any structures within the CLHD (Lizotte pers. comm.[b]). The Utah State Historic Preservation Office (SHPO) challenged that determination on the grounds that the proposed vibration limits were potentially inappropriate because of the elderly nature of the CLHD structures and the intensity of the proposed pile driving activities (Murphy pers. comm.[a]).

To address these concerns, UDOT reevaluated vibration levels in the CLHD in 2003. Three structures within the CLHD (i.e., 399 W. State Street, 398 W. State Street, and 393 W. State Street) are within 61 m (200 ft) of the proposed pile driving location for the State Street overpass, which, depending on the degree of force used to drive the piles (typical or high impact) and the soil conditions, could exceed the threshold and cause damage to those homes (e.g., 3.1 mm/sec [0.12 in/sec]). On April 14, 2004, FHWA and UDOT held a meeting with residents of the CLHD to discuss and take recommendations on minimizing these potential impacts on the district. Based in part on input received during that meeting, SHPO, FHWA, and UDOT revised their Memorandum of Agreement (MOA) to reflect measures to minimize vibration impacts on the CLHD resulting from pile driving activities. The complete text of the September 2005 MOA is included for reference in Appendix A.[2] These mitigation measures are summarized in Section 4.20.3.3, *Mitigation Measures*, below.

Historic Streetscape

The letter from the CLHD residents stated that adverse effects on historic streetscape and properties, including removal of street trees and changes in grade, street width, and elevation, could occur during reconstruction of the State Street overpass. Since publication of the Final EIS, the design of the overpass has been revised to eliminate the need to acquire property from any contributing element of the CLHD (see 4.16, *Historic and Archeological Resources*, for a description of the structures that contribute to the integrity of the CLHD). However, temporary easements would be needed to realign existing curbs and gutters and taper the road cross-sections from east to west in front of the properties at 399 W. State Street, 398 W. State Street, and 393 W. State Street.

A total of 121 sq m (1307 sq ft) of land would be modified by regrading and fill activities at 399 W. State Street and 398 W. State Street to provide new, permanent driveway access to those parcels (Figure 5-10).

[1] Figure 5-3 illustrates the boundaries of the Clark Lane Historic District.

[2] The MOA governs the treatment and disposition of resources in the study area that are under the jurisdiction of Section 106 of the National Historic Preservation Act (NHPA).

The footprints of the parcels at 399 W. State Street and 393 W. State Street would be increased by a total of 99 sq m (1,068 sq ft) to accommodate the realignment of curbs and gutter and the proposed road tapering, and the footprint of the parcel at 398 W. State Street would be reduced by 47 sq m (508 sq ft). Mitigation measures to offset these impacts and to ensure that the CLHD and its contributory elements are returned to their original preconstruction condition are stipulated in the September 2005 MOA (Appendix A) and summarized in Section 4.20.3.3 below.

The MOA also states that the mature trees in front of 399 W. State Street and 393 W. State Street would not be affected by the proposed build alternatives.

Vibrations from Trucks

The potential vibration effects of truck traffic on the CLHD are no longer a consideration because State Street is no longer being considered as a proposed haul route for construction traffic (Appendix A).

Construction-Related Visual Impacts

As described in the Final EIS, construction-related visual impacts would be essentially the same under all proposed build alternatives. During construction, the work zone would be cleared of vegetation and the exposed bare ground would likely contrast visually with the surrounding agricultural, recreational, and residential areas that viewers of the area are accustomed to seeing. Visual quality from sensitive viewer locations (e.g., residents of new homes in the Foxboro development that have been completed prior to construction activities) would be temporarily reduced during construction operations. Until construction is completed and the right-of-way is revegetated, the construction area would visually stand out.

The construction-related visual impacts, while likely greater in intensity than the operation-related visual impacts, would be temporary. As a result, visual impacts related to the operation of the proposed build alternatives, as described in Section 4.18.3.2, would have a greater long-term visual impact on viewers in the study area than would visual impacts related to the actual construction of those alternatives.

It should be noted that construction was initiated on the southern end of the Alternative D alignment prior to the court injunction. The construction-related visual impacts that occurred onsite were no greater than or different from those described in the Final EIS. However, because all construction-related work was stopped by the court injunction, the mitigation measures described in Section 4.18.3 of the Final EIS, which have not changed since its publication, were not carried out in those areas. In addition, in the vicinity of the northern terminus, UDOT has continued construction on projects outlined in the Farmington master plan (i.e., projects whose configuration is not dependant on the selection of any given build alternative) (City of Farmington 1998). As stated above, the construction-related visual impacts onsite are no greater than or different from those described in the Final EIS.

Construction-Related Noise Impacts

For all the proposed build alternatives, construction operations would consist of similar activities resulting in comparable construction-related noise impacts. Table 4.20-3 illustrates the noise levels produced by various types of construction equipment. Properly maintained equipment produces noise levels near the middle of the indicated ranges. The type of construction equipment used for this project typically generates noise levels of 80 to 90 dBA at a distance of 15 m (50 ft) while the equipment is operating (U.S. Environmental Protection Agency 1971; Toth 1979; Gharabegian et al. 1985).

Table 4.20-3 Typical Construction Equipment Noise Levels

Type of Equipment	Noise Level (dBA) at Specified Distance				
	15 m (50 ft)	20 m (500 ft)	26 m (1,000 ft)	30 m (1,500 ft)	610 m (2,000 ft)
Bulldozer	80	60	54	50	48
Front loader	72–84	52–64	46–58	42 –54	40–52
Jack hammer or rock drill	81–98	61–78	55–72	51–68	49–66
Crane with headache ball	75–87	55–67	49–61	45–57	43–55
Backhoe	72–93	52–73	46–67	42–63	40–61
Scraper and grader	80–93	60–73	54–67	50–63	48–61
Electrical generator	71–82	51–62	45–56	41–52	39–50
Concrete pump	81–83	61–63	55–57	51–53	49 - 51
Concrete vibrator	76	56	50	46	44
Concrete and dump trucks	83–90	63–70	57–64	53–60	51–58
Air compressor	74–87	54–67	48–61	44–57	42–53
Pile drivers (peaks)	95–106	75–86	69–80	65–76	63–74
Pneumatic tools	81–98	61–78	55–72	51–68	49–66
Roller (compactor)	73–75	53–55	47–49	43–45	41–43
Saws	73–82	53–62	47–56	43–52	41 - 50

Source: U.S. Environmental Protection Agency 1971.

Construction equipment operations can vary from intermittent to fairly continuous with multiple pieces of equipment operating concurrently. Assuming that a bulldozer (87 dBA), backhoe (90 dBA), grader (90 dBA), and front-end loader (82 dBA) are operating concurrently in the same area, peak construction-period noise would generally be about 94 dBA at 15 m (50 ft) from the construction site.

Locations within about 580 m (1,900 ft) of a construction site would experience occasional episodes of noise levels greater than 60 dBA. Areas within about 229 m (750 ft) of a construction site would experience episodes of noise levels greater than 70 dBA. Such episodes of high noise levels would not be continuous throughout the day and would generally be restricted to daytime hours.

Most construction activities associated with the proposed action would occur during daylight hours, which would minimize noise impacts. Incidents of noise conflicts could occur when construction directly adjacent to residential, park, or recreation areas is necessary.

4.20.3.3 Mitigation Measures

Section 4.20 of the June 2000 Final EIS included certain mitigation measures for construction activities, and there has been no change to these mitigation measures. Some additional construction-related mitigation measures were included in resource-specific sections of the Final EIS and of this Supplemental EIS as appropriate, and are not repeated in this section.

The following new construction-related mitigation measures have been proposed as part of this Supplemental EIS.

- **BMPs**. The following construction best management practices (BMPs) will be implemented during construction.
  - Silt fence.
  - Berms.
  - Check dams.

    The silt fence will be placed to keep all runoff from leaving the right-of-way. Inside the silt fence, the contractor will be required to place earthen berms along both sides of the right-of-way. Vegetation will be required between the silt fence and earthen berms. Check dams will then be placed at each drainage crossing. These BMPs will ensure that no runoff leaves the right-of-way.
- **Mitigation for Noise Impacts.** To reduce temporary noise from construction, contractors will comply with all state and local regulations relating to construction noise. In addition, the following measures will be incorporated into contract specifications to help reduce the effects of construction noise.
  - Restrict construction to daytime hours within 305 m (1,000 ft) of residences. No construction will be performed within 305 m (1,000 ft) of an occupied dwelling unit on Sundays or legal holidays or between 10:00 p.m. and 6:00 a.m. on other days. Any variance from this condition will require approval by the UDOT construction manager.
  - All equipment will have sound-control devices at least as effective as the original factory-installed devices. No equipment will have unmuffled exhaust.
  - The noise from any rock-crushing or screening operations performed within 914 m (3,000 ft) of any occupied dwelling unit will be mitigated either by placing material stockpiles between the operation and the affected dwelling or by other means approved by the UDOT construction manager.
  - As directed by the UDOT construction manager, the contractor will implement appropriate additional noise mitigation measures, possibly including changing the location of stationary construction equipment, shutting off idling equipment, rescheduling construction activity, notifying adjacent residents in advance of construction work, or installing acoustic barriers around stationary construction noise sources.

- **Mitigation for Truck Traffic on Haul Routes**. UDOT will specify that the contractor use only state roads as haul routes. Haul routes will vary depending on where construction is taking place along the roadway.

- **Mitigation for Construction-Related Air Quality Impacts**. Construction-related air quality impacts were discussed in Section 4.20 of the previous Final EIS, but no mitigation measures were prescribed. Fugitive dust, which is dust generated by construction equipment such as haul trucks and earth-moving vehicles, will be mitigated according to a dust control plan to be developed by the contractor according to Utah Division of Air Quality standards. This plan will include measures for minimizing fugitive dust, such as applying dust suppressants and water sprays, minimizing the extent of disturbed surface areas, and restricting activities during periods of high wind.

- **Mitigation for Potential Vibration Impacts on the Clark Lane Historic District from Pile Driving Activities**. As described in Section 4.20.2 above, mitigation measures for potential impacts on the CLHD associated with pile driving activities at the State Street overpass were incorporated into the September 2005 MOA (Appendix A). In summary, the MOA stipulates maximum energy ratings for pile driving hammers, prescribes vibration monitoring requirements for the home at 399 W. State Street, provides specific guidance on measures to take if vibration levels exceed 0.12 in/sec, and includes a requirement for pre- and post-construction surveys of structures in the CLHD and notification of homeowners in the district prior to pile driving activities.

- **Mitigation for Potential Historic Streetscape Impacts in the Clark Lane Historic District**. As described in Section 4.20.3.2, none of the build alternatives would affect mature trees in front of 393 W. State Street and 398 W. State Street in the CLHD. To ensure that the CLHD and its contributory elements are returned to their original preconstruction condition, the September 2005 MOA stipulates that the design of the State Street overpass include provisions for minimizing grade changes, redesigning and incorporating sidewalks within the CLHD into the sidewalks for the new bridge structure, and maintaining existing landscape and streetscape features.